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## MECHANICS.

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231. Proposed by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.

A body is projected towards the Earth's center with a velocity from infinity at a distance  $a=2r$  from the center. If the Earth were an airless sphere with a radius equal to its present mean radius, and gravity equal to its present intensity, and having a hole from surface to center, with what velocity and in what time would it arrive at the center.

232. Proposed by J. A. CAPARO, C. E., Notre Dame University, Notre Dame, Ind.

Given, the diameter  $d$  of a gas engine cylinder, length of connecting rod  $l$ , stroke  $s$ , velocity of crank pin  $v$ , length of exhaust port equal to one-third the circumference of the cylinder. Find the average height  $h$  of exhaust port opened during one cycle if the port is fully opened, when the piston is at its lowest position.

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## NUMBER THEORY AND DIOPHANTINE ANALYSIS.

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163. Proposed by PROFESSOR R. D. CARMICHAEL, Anniston, Ala.

Prove that the equation  $yn = mx + 1$  always has at least one positive integer solution (different from  $y=1, x=0$ ), whatever integer values  $m$  and  $n$  may have.

164. Proposed by G. J. GRIFFITHS, M. A., in Educational Times (Unsolved).

Prove that the sum of the squares of the reciprocals of all integers which are not divisible by the square of any prime is  $15/\pi^2$ .

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## NOTES AND NEWS.

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Mr. H. P. Kean, Assistant in Mathematics at the University of Illinois, has been elected Professor of Mathematics in Ripon College. ED. M.

Will any reader who reads this note help me to find a copy of the *Mathematical Companion* edited and published by John D. Williams? This journal was started in 1828 and was published until 1831. Bolton, in his catalog of scientific journals, says there is a copy of this journal in the Library of Harvard University. Professor Byerly informed me that he had the librarian make a careful search for it with the result that a sort of prospectus of it was all that could be found. Also who has a complete set of Harvell's *Messenger of Mathematics*? ED. F.

Courses in Mathematics for the year 1909-10, University of Pennsylvania. By Professor E. S. Crawley: Solid analytic geometry, two hours; Higher plane curves, three hours; Mathematics of insurance, two hours. By Professor G. E. Fisher: Advanced calculus, two hours; Calculus of variations, two hours. By Professor I. J. Schwatt: Infinite series and products, two hours; Definite integrals, three hours. By Professor G. H. Hallett: Modern higher algebra, three hours (first half year); Galois theory of equations, three hours (second half year); Theory of groups of a finite order, three